Student Name:_____

Group Members: _____

2021 Western Colorado Elementary Science Fair

Student Guided Packet

Testable Question:

- How does _____ affect _____?
- What is the effect of _____ on _____?

Example Questions:

- **What is the effect of the type of ball on how high it will bounce?**
- What is the effect of type of nail polish on how resistant it is to chipping?
- How does the amount of water affect how tall a sunflower grows?
- How does the time of day affect how many birds are in the trees?
- What is the effect of battery type on how long it can light a bulb?
- How does the temperature affect how active lizards are in the desert?
- How does the amount of yeast affect the height of a loaf of bread?
- What is the effect of the type of shoe on how high someone can jump?
- How does the type of surface cleaner affect the amount of bacteria killed?
- How does the type of bubble gum affect the size of the bubble blown?
- What is the effect of the type of cloth on how well it prevents particles from traveling when a person coughs?
- What is the effect of the number of fins on how fast a fish can swim?
- How does the concentration of ionize affect the taste or water?
- What is the effect of the volume of water on the velocity it travels in a river?

My testable question is…

Purpose:

- Why is your question important to answer? How will it impact humans and society?
    - Sentence Starters:
        - Researching this topic is important, because…
        - This research can be applied to…
        - Finding an answer to this question will impact society, because…
        - This research can be used by scientists for…
        - For example…
    - Example:
      This research is important because it can help athletes when they play different sports, by understanding how the material of the ball changes how it acts. This information can also be used by engineers, to understand what material is bouncier than others, when creating different machines/things that might fall. For example, if engineers are creating mats to put under rock climbers, this research can be applied to understand which material would create less force when colliding.

Independent Variable:(Cause, the thing you are changing and testing)

Example: Type of ball

Dependant Variable: (Effect, the thing you are measuring)

Example: Height it bounces

Controls: (What stays the same)

Example: Tape Measuring, height the ball is dropped

Hypothesis (educated guess):

- (If__IV__, then__DV__,because… _prior knowledge or background research_):
  Example: If different types of balls are bounced, then the height it bounces will change, because different sporting balls are made of different materials, and different materials have different elastic properties.

Materials:

- What materials do you need to conduct this investigation?
  Example:
  - 1 Football
  - 1 Basketball
  - 1 Baseball
  - 1 Tennis Ball
  - 1 Tape Measurer
  - 1 Roll of Tape

  - _____
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Procedure:

- Write out detailed steps for what you will need to do to conduct your investigation. (This is similar to a cooking recipe, so be sure to be as detailed as possible!)
    - Example:
        1. Collect all required materials.
        2. Tape the measuring tape to the wall, with 0 being at the bottom.
        3. Take a football, and position it so the bottom of the ball is 3 feet off the ground. Drop the ball and measure how high, in feet, the ball bounced up. Measure from the bottom of the ball.
        4. Record the bounce height in the data table.
        5. Repeat steps 3-4, using a basketball, baseball, and tennis ball.

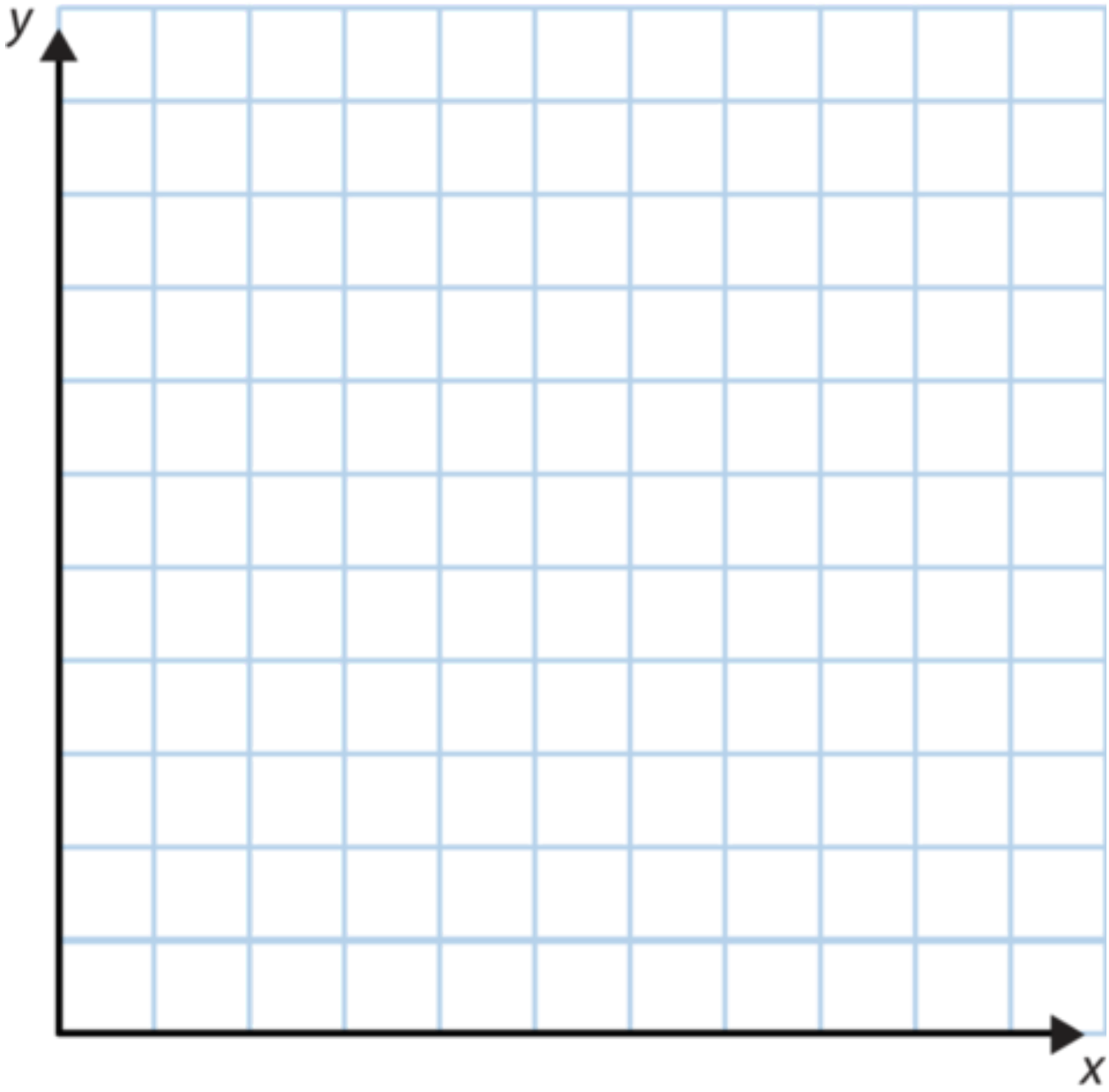
Data Table:

- Create a data table for you to record your observations and data.
  - Example:

Type of Ball	Bounce Height (ft)
Football	1.5
Basketball	3.5
Baseball	1.0
Tennis Ball	4.5

Graphs:

- The IV should be on the X-axis and DV on the Y-axis. Be sure all numbers are written with a constant interval.



Analysis and Conclusion:

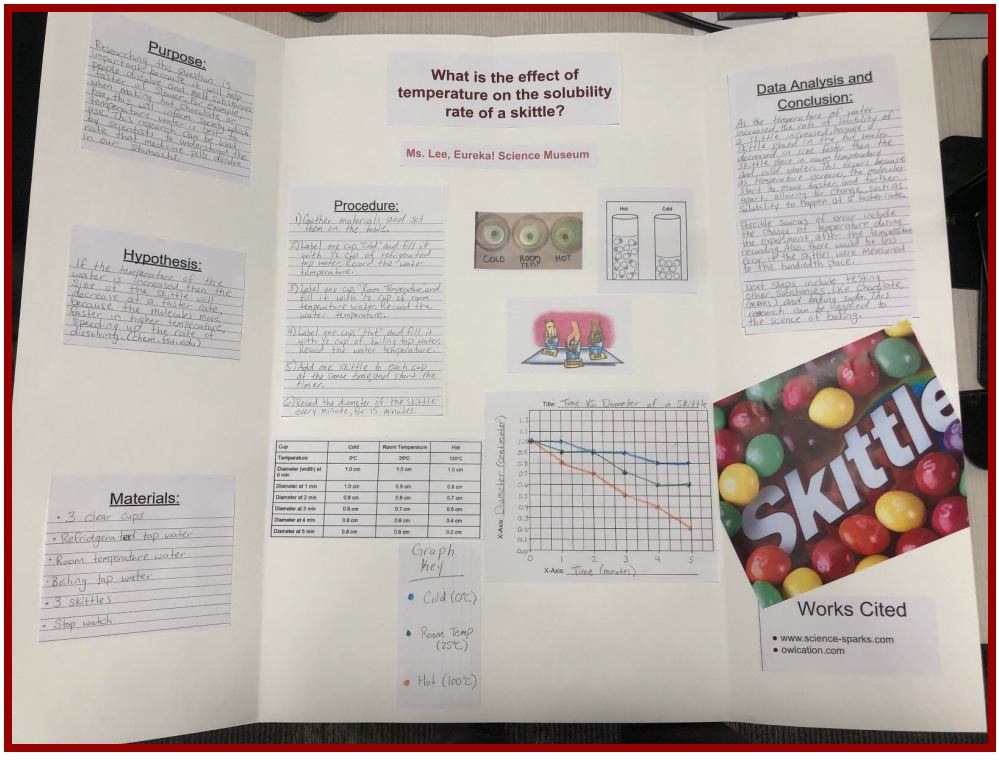
- This paragraph summarizes your findings and results.
  - Sentence Starters:
    - The data shows…
    - Observations during the experiment were…
    - Based on the data, the hypothesis was…
    - Possible sources of error are…
    - If this experiment were repeated, _____ would be changed, because…
  - Example:
    - The data shows that different types of sporting equipment bounces at different heights. Observations during the experiment were that the tennis ball bounces the highest, and the baseball bounces the lowest. Based on the data, the hypothesis was supported. Possible sources of error include the 4 different balls being different sizes and weights. Also, it was challenging getting the bounce height because the balls dropped so quickly. If this experiment were repeated, the number of trials would be changed, because it would be more accurate to bounce each ball multiple times, and then calculate the average.

Works Cited:

- List any websites or books you took information of images from.

Poster:

- Each section you previously wrote will need to be typed up, printed, and glued to a tri-fold poster board.
- There should be no spelling or grammar mistakes, and papers need to be cut as straight as possible.
- All fonts should be easily read, with a font size of at least 25.
- All poster sections need to be placed using the diagram below.
- Images are important, and can either be photos you take from the experiment, photo data, or images that relate to your investigation.



PURPOSE

This section describe why your research is important and how it could impact society. Discuss how your topic could be applied to real life situations.

HYPOTHESIS

Your educated prediction before conducting your experiment.

LIST OF MATERIALS

A list of supplies used to conduct your experiment

TITLE

Your scientific testable question.

STUDENT NAME(S) AND SCHOOL

PROCEDURE

Detailed steps of what you did during your experiment.

Independent and Dependent Variables

Controls

PHOTOS

Photos related to your experiment.

DATA TABLE AND/OR GRAPH

Your experiment data and graphs.

ANALYSIS AND CONCLUSION

A summary of your results and how they compare with your hypothesis.

Discuss possible sources of error within your experiment.

What are the next steps with this experiment? Does it need to be repeated? What would you change if repeated?

WORKS CITED

A list of websites, papers, or books used during your project.

Scoring:

Judges will score posters based on this following tentative scoring rubric:

Project Elements			Possible Score	Score
Testable question references a cause and effect relationship and a measurable change	OR	Proposed solution/invention references a specific outcome and a measurable change	**10**	
Purpose is clear and discuss the importance of this project/topic			**10**	
Hypothesis is based on background research or prior knowledge			**10**	
Variables and Controls are clearly defined			**10**	
Materials are appropriate and a detailed list is given			**10**	
Procedure is sequential and describes the investigation process clearly			**10**	
Data is clearly provided as either graphical, quantitative, or observational			**10**	
Analysis and Conclusion describes the trends and patterns found in the data. Clearly states acceptance or rejection of hypothesis, possible sources of error, and suggestions for further efforts			**10**	
Presentation • Clear and Concise • Summarizes the main steps and purpose of the project • Presenter makes eye contact • Presenter is able to answer additional questions from judges and shows a clear understanding of their project			**20**	
Total Score			**100**	
Additional Comments:				

This scoring sheet has been modified from the sciencefaircentral.com resource